

REMARKS

Applicant requests reconsideration of the application in view of the foregoing amendments and the discussion that follows. The status of the claims as of this response is as follows: Claims 20-22 and 24-35 are pending. Claims 1-19 and 23 were canceled previously and claim 35 has been canceled herein. Claims 20, 26, 29-31, 33 and 34 have been amended herein.

The Amendments

Claims 20 and 26 were amended to recite that the head system is loaded with biopolymers or biomonomers. Support therefor is in the specification, for example, original claim 29. Claim 20 was also amended to recite that the apparatus is for synthesizing an array of biopolymers. Support therefor is in the specification, for example, at the top of page 5.

Claims 29-31 and 33-34 were amended as a result of the amendments to claims 20 and 26 above in order to satisfy their respective dependency from the independent claims.

Claim Objections

Applicant acknowledges the withdrawal of the objection to claims 20, 22 and 28 made in the previous Office Action.

Applicant submits that the cancellation of claim 35 above obviates the objection to claim 35 set forth in the present Office Action.

Rejection under 35 U.S.C. §112

Applicant acknowledges the withdrawal of rejection of claims 26-28 under 35 U.S.C. 112, second paragraph.

Claims 20-22 and 24-35 were rejected in the present Office Action under the second paragraph of the above code section, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action contends that claim 20 is indefinite in reciting the phrase, "each dispenser set depositing a drop set at a distance ahead of a drop set deposited by a preceding dispenser set...." The Office Action asserts that this limitation is confusing in view of what is being disclosed in the specification. Figure 4A of the specification, continues the Office Action, when describing the first pass of the

head system comprising multiple successive sets of dispensers, discloses that dispenser set E, while moving in direction 204(a) (or to the left direction), dispenses from dispensers 4, 3, 2, 1, in that order. (Applicant believes that "right" direction was intended since the arrow 204a in the drawing in the Office Action is pointing to the right.) Hence, for example, argues the Office Action, dispenser 3 deposits a drop set at position 3, which is not "ahead" of the drop set deposited by dispenser 4 (which is the preceding dispenser) but "behind" the drop set deposited by the preceding dispenser. Thus, concludes the Office Action, the claims are in contradiction to that which is disclosed in the instant specification and clarification is required.

Applicant respectfully traverses this ground of rejection. Claim 20 recites that the dispenser sets pass over a given location on the substrate as the head system advances in the first direction, with each dispenser set depositing a drop set at a distance ahead of a drop set deposited by a preceding dispenser set which is less than the distance to the successive drop dispenser set which deposits the next drop set, so as to form the arrays. This may be understood with reference to Figs. 4A-4G and the discussion in the specification at pages 10-13. As indicated in the specification, head system 210 comprises two heads 210a and 210b. Each head 210a and 210b is shown with five parallel rows (E-A) and two columns (1,2 for head 210a and 3,4 for 210b) of dispensers. Referring to Fig. 4A, in pass 1 of head system 210, drop sets 1,2,3,4 are deposited from dispensers in row E, which correspond to a dispenser set (dispenser set E for purposes of discussion). Arrow 204a (shown in Fig. 4B) indicates the direction of movement of head system 210 for depositing each of drop sets of the row in question for pass 1.

Head system 210 is then advanced in the direction indicated by arrow 63a (which corresponds to the first direction of claim 20) in Fig. 4B so that dispensers in row D (dispenser set D for purposes of discussion) and the dispensers of dispenser set E both dispense. The drop sets dispensed by dispenser set D dispense ahead of the row of drop sets dispensed by dispenser set E. Referring to Fig. 4B, the drop sets from dispenser set D are represented by circles with lines at about 45 degrees from horizontal. During this second pass (pass 2 of Fig. 4B), the same pattern of deposition is repeated but with drop sets being deposited from both dispenser sets D and E as shown.

As can be seen in Fig. 4B, the drop set deposited by dispenser set D is deposited at a distance ahead of a drop set deposited by a preceding dispenser set

E as head system 210 is advanced in direction 63a. As also seen from Fig. 4B, each dispenser set deposits a drop set (drop set from dispenser set D) at a distance ahead of a drop set deposited by a preceding dispenser set (drop set from dispenser set E), which is less than the distance to the successive drop dispenser set which deposits the next drop set. That is, the distance between drop sets from dispenser set E and dispenser set D is less than the distance between dispenser set E and dispenser set D of head system 210 or between successive drop sets from dispenser set E.

Figs. 4C-4G depict the above scheme as head system 210 is advanced for each of dispenser sets E-A until the array is completed.

#### Rejection under 35 U.S.C. §101

Applicant acknowledges the indication in the Office Action that the rejection of claims 26-28 under 35 U.S.C. 101 was withdrawn.

#### Rejection under 35 U.S.C. §102

Applicant acknowledges the withdrawal of the rejection of claims 26-28 under paragraph (b) of the above code section as being anticipated by Lipshutz, *et al.* (U.S. Patent No. 5,737,729) (Lipshutz).

Claims 20-22, 24-28 and 35 were rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi, *et al.* (U.S. Patent No. 5,624,484) (Takahashi).

Claims 20 and 26 now recite that the head system is loaded with biopolymers or biomonomers. Takahashi is silent as to such a head system.

Without acquiescing in the arguments advanced in the Office Action, Applicant submits that Takahashi does not disclose or suggest an apparatus wherein a processor controls the head system such that the dispenser sets pass over a given location on the substrate as the head system advances in the first direction, with each dispenser set depositing a drop set at a distance ahead of a drop set deposited by a preceding dispenser set which is less than the distance to the successive drop dispenser set which deposits the next drop set. There is no disclosure or suggestion in Takahashi of a processor that performs the above function.

As can be seen particularly from Fig. 4G (and as discussed in the specification at page 13, lines 4-14), the distance between adjacent feature rows within any of the arrays is less than the distance between adjacent dispenser sets

(that is, the rows of dispensed drops are “compressed” relative to the respective dispenser rows). Similarly, columns 1-4 of deposited droplets are spaced closer together than the columns 1-4 of respective dispensers (that is, the dispensed drop columns are “compressed” relative to the respective dispensers). This decrease in deposited drop spacing in any direction of travel of the head system, is readily obtained, for example, using processor 140 correctly timing dispenser actuation as head system 210 moves over the substrate. The specification indicates that such compression provides an advantage of allowing for arrays with deposited drop spacing, as measured in any direction of head travel relative to the substrate, to be independent of the spacing of the respective dispensers that deposited them.

Takahashi does not disclose or suggest such an approach either explicitly or inherently. The processor of Takahashi appears to operate his printing head in a manner similar to that known or conventional in the art.

Claims 20-22 and 24-35 were rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Blanchard (U.S. Patent No. 6,028,189).

Without acquiescing in the arguments advanced in the Office Action, Blanchard does not disclose or suggest the apparatus of claims 20-22 and 24-35 for reasons similar to those discussed above with regard to Takahashi. As recognized in the Office Action, the teaching of Takahashi and Blanchard differs in that Takahashi’s print head dispenses inks whereas Blanchard’s print head dispenses nucleotide monomers. Applicant submits that in all other respects the discussion above with regard to the deficiencies of the Takahashi reference with regard to the present claims applies equally to the Blanchard reference.

Applicant submits that Blanchard does not disclose or suggest an apparatus wherein a processor controls the head system such that the dispenser sets pass over a given location on the substrate as the head system advances in the first direction, with each dispenser set depositing a drop set at a distance ahead of a drop set deposited by a preceding dispenser set which is less than the distance to the successive drop dispenser set which deposits the next drop set.

As discussed above, the distance between adjacent feature rows within any of the arrays (see Fig. 4G, for example) is less than the distance between adjacent dispenser sets (that is, the rows of dispensed drops are “compressed” relative to the respective dispenser rows). Similarly, columns 1-4 of deposited droplets are spaced closer together than the columns 1-4 of respective dispensers (that is, the dispensed

drop columns are "compressed" relative to the respective dispensers). This decrease in deposited drop spacing in any direction of travel of the head system, is readily obtained, for example, using processor 140 correctly timing dispenser actuation as head system 210 moves over the substrate. The specification indicates that such compression provides an advantage of allowing for arrays with deposited drop spacing, as measured in any direction of head travel relative to the substrate, to be independent of the spacing of the respective dispensers that deposited them.

Blanchard does not disclose or suggest such an approach either explicitly or inherently. The processor of Blanchard operates his printing head in a manner similar to that known or conventional in the art.

Conclusion

Claims 20-22 and 24-34 satisfy the requirements of 35 U.S.C. §§112 and 102. Claim 35 was canceled. Allowance of the above-identified patent application, it is submitted, is in order.

**Applicant respectfully requests that Applicant be given the opportunity for a telephonic interview prior to the issuance of a further office action in the event that the Examiner may have an adverse view to any of the above.**

Respectfully submitted,



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